May 22, 2015

Dr. Carol Roland-Nawi
State Historic Preservation Officer
Office of Historic Preservation
Department of Parks & Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816
Attn: Mr. Mark Beason

Subject: NASA Section 106 Consultation: Biological Sciences Laboratory N288 Project at Ames Research Center, Moffett Field, California

Dear Dr. Roland-Nawi:

As part of its responsibilities under Section 106 of the National Historic Preservation Act (NHPA), the National Aeronautics and Space Administration (NASA) is requesting consultation for the Biological Sciences Laboratory N288 Project (project or undertaking) located at Ames Research Center (ARC) at Moffett Field, California. NASA has determined that this project constitutes an undertaking under NHPA. NASA requests review and consultation concerning the following project description, identification efforts, and effects analysis for the project, and the State Historic Preservation Officer's (SHPO) concurrence that NASA's finding of no adverse effect is appropriate, pursuant to 36 Code of Federal Regulations (CFR) 800.5(b).

Description of the Undertaking

The project will construct a two-story research facility at the northeast corner of the intersection of DeFrance (Arnold) Avenue and Durand Road on the ARC campus. The project site is currently an open green space and the former site of Building N218, the 14-ft. Transonic Wind Tunnel that was demolished in 2008. The purpose of the project is to expand research facilities at ARC and to provide a dedicated building for the biosciences research program composed of multidisciplinary research teams conducting research in fundamental space biology, astrobiology/exobiology and synthetic biology to enable NASA's future plans for long duration space flight missions. Research will test how living systems react to radiation, microgravity and how living systems will adapt and evolve in space. The project will create a working environment that facilitates the evolving needs of this research. The project will include construction and operation of Building N288, a two-story, 50,000-sq.-ft. modern science

laboratory facility. The facility will consolidate center-wide labs and researchers to improve collaboration and foster an environment for innovation and breakthrough science.

Area of Potential Effects

The area of potential effects (APE) was defined to encompass the first tier of buildings adjacent to the project's footprint (Attachment A). For archaeological resources, the APE was defined as the limits of the project area, including areas of temporary staging and construction ground disturbance. The proposed APE boundary includes all historic properties that may be indirectly affected by the project.

Identification of Historic Properties

The APE has been previously surveyed for archaeological and architectural resources, and architectural resources have been previously evaluated for National Register of Historic Places (NRHP) eligibility.

No archaeological resources or areas of potential archaeological sensitivity have been previously identified in or around the APE. The project area is the former location of Building N218, and has since been cleared and landscaped with an open lawn space. The ground surface is highly disturbed, and no new survey was performed. The area was not identified in the 2002 Final Programmatic Environmental Impact Statement or the 2014 Draft Integrated Cultural Resources Management Plan for ARC as having archaeological sensitivity.

Previously surveyed architectural resources located in the APE include the following buildings:

Name	Description	Year Built	NRHP Evaluation
N215	7-ft. x 10-ft. Wind Tunnel No. 1	1940	Contributor to proposed Ames Wind Tunnel Historic District
N216A	Model Preparation Building	1973	Not eligible
N216B	Army Model Assembly Building	1969/1973	Not eligible
N218A	Electrical Equipment Building	1970/1984	Not eligible
N219	Aeroflightdynamics Directorate	1940	Not eligible
N220	Technical Services Machine Shop	1940	Contributor to proposed Ames Wind Tunnel Historic District
N221	40-ft. x 80-ft. Wind Tunnel	1944	Eligible for individual listing; Contributor to proposed Ames Wind Tunnel Historic District
N235	Cafeteria Building	1964/1990	Not eligible
N246	Model Construction Facility	1973	Not eligible
N247	Astrobiology Institute and Space Biosciences	1975	Not eligible

Known historic properties in the proposed NRHP-eligible Ames Wind Tunnel Historic District are located in the APE, including three contributors: Buildings N215 (7-ft. x 10-ft. Wind Tunnel No. 1), N220 (Technical Services Machine Shop), and the individually NRHP-eligible Building N221 (40-ft. x 80-ft. Wind Tunnel) (see descriptions in "Affected Historic Properties" below).

The remaining buildings in the APE are not eligible for listing in the NRHP. Buildings N219 and N235 are over 50 years old but have been substantially altered within the past 50 years and are therefore considered not eligible for the NRHP. Buildings N216, N216B, N218A, N246, and N247 were evaluated as not eligible for the NRHP in 2005 (Page and Turnbull 2005). These buildings are less than 50 years old, and there have been no substantial changes in the conditions or significance of these buildings since the 2005 recording that would elevate them to exceptionally significant to meet the NRHP criteria. In addition, none of these buildings have been identified as contributors to the proposed Ames Wind Tunnel Historic District.

Affected Historic Properties

Proposed Ames Wind Tunnel Historic District

The proposed Ames Wind Tunnel Historic District overlaps with the APE (see Attachment A). The NRHP nomination for the proposed district is currently under preparation, and will be submitted to SHPO for review later in 2015. For the purposes of this consultation, the proposed Ames Wind Tunnel Historic District is assumed eligible for listing in the NRHP. The proposed district will include six contributing buildings—Buildings N215, N220, N221, N221B (80-ft. x 120-ft. Wind Tunnel, not in the APE), N226 (6-ft. x 6-ft. Wind Tunnel, not in the APE), and N227A-D (Unitary Plan Wind Tunnel, not in the APE)—and will be nominated under NRHP Criterion A for its association with science and invention in aviation research, space exploration and settlement, and engineering; under NRHP Criterion B for its association with two individuals, Smith J. DeFrance (Engineer-in-Chief who oversaw the creation of ARC and first Center Director at ARC) and R.T. Jones (pioneer in aerodynamics and aeronautical engineering who developed the sweep theory and oblique wing at ARC); and under NRHP Criterion C for distinctive engineering, design, and construction of the individual wind tunnels. The period of significance for the proposed district will extend from 1940 (related to the construction of the first National Advisory Committee for Aeronautics (NACA) facilities in the district) to 2006 (the end of the Space Shuttle program, or alternatively, to a date to be determined). The boundary for the proposed district was delineated to specifically include the wind tunnels and those buildings directly associated with the wind tunnel research. Three contributors to the district, Buildings N215, N220, and N221, are located in the APE adjacent to the project site and represent the character of the proposed district.

Building N215

Building N215, 7-ft. x 10-ft. Wind Tunnel No. 1, contributes to the proposed district as a highly specialized facility and the first wind tunnel to operate at ARC. It is composed of a two-story

building and wind tunnel structure. The two-story portion of the building is oriented along Durand Road and has a rectilinear plan (Figure 1). The building has a concrete foundation, steel-reinforced concrete walls, and a flat roof. The exterior walls feature grooved horizontal concrete bands across each façade that articulate the first and second floors. The building has three-over-three mixed steel and wood windows throughout. The main entry along Durand Road features a concrete awning with rounded corners. Exterior steel and concrete stairs have been added to this side of this building.

Figure 1. Building N215, southwest corner on Durand Road.

Building N220

Building N220, Technical Services Machine Shop, contributes to the proposed district as the machine shop where custom research models and the operating blades for the wind tunnels were crafted. It is a two-story building with a rectangular plan (Figure 2). The building has a concrete foundation, steel-reinforced concrete walls, and a flat roof. The exterior walls feature grooved horizontal concrete bands across the south, east, and west sides that articulate the first and second floors and contain steel-framed industrial windows. The north side of the building along Durand Road contains steel nesting hangar doors with continuous steel windows in the first and second stories.

Figure 2. Building N220, north side along Durand Road, facing the project area.

Building N221

Building N221, the 40-ft. by 80-ft. Wind Tunnel, is a gigantic full-scale wind tunnel historically used to test full-scale aircraft models (Figure 3). The property has been determined eligible for the NRHP (Attachment B). In addition to being a contributor to the proposed district, Building N221 is individually eligible under NRHP Criteria A and C for its association with science and invention in aviation research, space exploration and settlement, and engineering, and meets Criteria Consideration G for exceptional significance. Three periods of significance were identified; under Criterion A, the period of significance was 1944 (when testing first began in the facility) to 1969 (when NASA's first astronauts landed on the moon), and under Criterion C, from 1944 (when construction of N221 was completed) to 1955 (50 years at the time of evaluation) (ARG 2004).

Figure 3. Building N221, southeast corner on DeFrance Avenue.

Assessment of Effects

The Criteria of Adverse Effect pursuant to 36 CFR 800.5(a)(1) are applied to assess effects of the undertaking on historic properties within the APE:

> (1) Criteria of adverse effect. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

With the exception of the potential to affect unknown subsurface archaeological resources, the project is not anticipated to have any direct effects on historic properties.

The project has the potential for indirect effects through visual and contextual changes that may alter the setting of the proposed Ames Wind Tunnel Historic District, including Buildings N215, N220, and N221. However, alterations that are consistent with the Secretary of Interior's Standards for the Treatment of Historic Properties are not considered an adverse effect. The new construction of Building N288 will be infill on the former site of Building N218 and within the

proposed Ames Wind Tunnel Historic District. Recommendations for new infill construction are equal to those for compatible new additions set forth in the Standards for Rehabilitation, specifically Standards 9 and 10.

Standard 9 states:

> New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

The project will not destroy any historic materials. The main consideration for the new construction is how it will impact the character of the proposed historic district in which it is located and its contributors. Buildings N215 and N221 are highly specialized wind tunnel structures, and Building N220 is associated with the wind tunnels through its function as the machine shop where models and blades for the wind tunnels were crafted. Building N221, the 40-ft. x 80-ft. Wind Tunnel, is located across DeSmith Avenue from the project area, but has a gigantic size and massing that uniquely dominates the proposed district. The setting for Building N221 is generally composed of relatively much smaller buildings, and streetscape and landscape features. To be compatible with Building N221's setting, the project should complement its surrounding buildings. Architecturally, Buildings N215, N220, and the former Building N218 shared similar features, including streamlined Moderne detailing in concrete, steel and glass exterior forms, flat roofs, grouped industrial-style windows, and concrete canopies over main entrances. It follows that infill construction on the site of Building N218 be compatible with the massing, size, scale, and architectural features of Buildings N215 and N220.

The design intent for Building N288 is to achieve a balance between differentiation and compatibility within the site and the proposed district (Figure 4) (see Attachments C-G). The new construction will be differentiated from the adjacent historic buildings through its contemporary design that features a façade system composed of exposed cast-in-place concrete shear wall, architectural rainscreen, and glazed curtain wall. The proposed height for Building N288 is two stories, which is generally consistent with the existing height of the building façades in the proposed district and immediately adjacent to the project site. The proposed massing of Building N288 is rectangular with recessed and setback sections that reflect the functional forms of the existing buildings in the district (Figure 5). The proposed setback from Durand Road maintains the character of the present relationship of adjacent historic buildings to the street. The proposed materials are cast-in-place concrete, metal, and glass, which are similar in texture and color to those in the proposed district. The architectural design incorporates an emphasis on horizontality and exposed structural form and functionality. Overall, the new construction will be compatible through an appropriate height, setback, orientation, differentiated design, and materials.

Figure 4. Project site with N221 in background, view facing northwest.

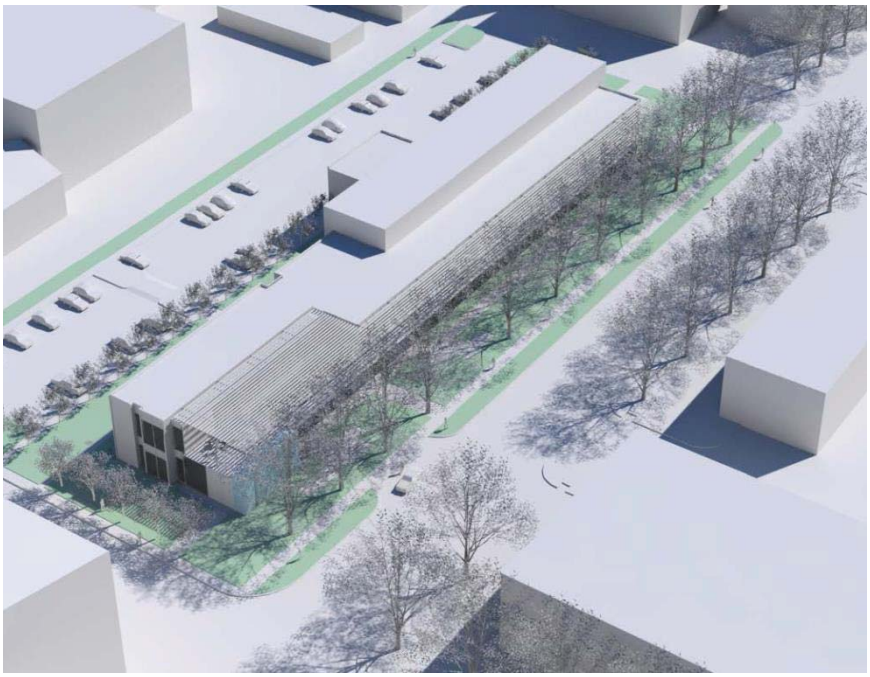


Figure 5. Model of Building N288, aerial view (intersection of Durand Road and DeFrance Avenue at lower left).

The historic properties that contribute to the proposed district will remain predominant and will retain their historic character, thus protecting the integrity and environment of the historic properties in the APE and being consistent with Standard 9.

Standard 10 states:

> New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The project proposes to construct a permanent facility that will not be feasibly reversible. However, as a free-standing infill building where a building once existed, the proposed Building N288 will not impair the essential form or integrity of the adjacent historic buildings or the proposed historic district consistent with Standard 10.

As a whole, the project will minimally alter the setting of the proposed district and its contributors in the APE. The new construction will be contained within the historical footprint of the former Building N218 and will have a minimized profile through its modern design. Proposed landscaping, including areas of lawn and shade trees, is in keeping with the current setting of the adjacent historic properties. The proposed function of Building N288 as a research facility, although dedicated to biosciences, will be in keeping with the historical associations of research and design at ARC, and the new facility will reflect the changing nature of the research center following guidance in the Advisory Council for Historic Preservation's (ACHP) 1991 *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities* (ACHP 1991). Construction of Building N288 will have no impact on adjacent historic properties' integrity aspects of location, design, materials, workmanship, or association. The overall impact of the new infill construction will not significantly alter adjacent historic properties' integrity aspects of setting or feeling because of its design, which is consistent with the Secretary of Interior's Standards, nor constitute an adverse effect.

Public Participation

Pursuant to 36 CFR 800.5(c), NASA is notifying the ACHP and consulting parties of the finding of no adverse effect for this undertaking, and is providing the documentation herein as specified in 36 CFR 800.11(e). Currently, there are no federally recognized Native American Tribes associated with the location of the APE.

NASA has determined that the project conforms to the NASA Ames Development Plan Final Programmatic Environmental Impact Statement, for which a Record of Decision was signed in November 2002. Further evaluation and public participation under the National Environmental Policy Act, if necessary, will be performed when the project is further along in the design process.

Conclusions

The proposed NRHP-eligible Ames Wind Tunnel Historic District and its contributors Buildings N215, N220, and N221 (also individually NRHP-eligible) are historic properties that were identified within the undertaking's APE, but will not be visually or contextually impacted negatively by the undertaking. The significance of the adjacent historic properties is primarily associated with research and development, important researchers, and exceptional engineering dating to the 1940s and continuing through the 20th century. This assessment of effects found that the proposed design of the new Building N288 facility is sufficiently differentiated from and compatible with adjacent historic properties within the proposed district, and that it is consistent with the Secretary of Interior's Standards. As a new research facility on the site of a former research facility, the proposed Building N288 will have an appropriate function, scale, and aesthetic to complement the proposed Ames Wind Tunnel Historic District and its contributors. NASA has determined that the undertaking's impact would not constitute an adverse effect due to its adherence to the Secretary of Interior's Standards and its minimal impact on the ability of the adjacent historic properties to convey their historical and architectural associations that make them eligible for the NRHP.

NASA, in applying the Criteria of Adverse Effect, proposes that a finding of no adverse effect is appropriate, and is seeking the SHPO's concurrence in this finding.

Please contact me at keith.venter@nasa.gov or at (650) 604-6408 with your concurrence and/or comments or questions concerning this undertaking within 30 days of receipt of this letter.

Sincerely,

Keith Venter
Historic Preservation Officer
Ames Research Center, MS 213-8
Moffett Field, California 94035

Attachments

A. APE
B. SHPO Correspondence
C. Location Plan
D. Site Plan
E. Elevations
F. Existing Features and Materials in the Ames Wind Tunnel Historic District
G. Renderings

References

Advisory Council for Historic Preservation (ACHP)

1991 *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities.* Excerpts available online at http://www.achp.gov/balancingsum.html.

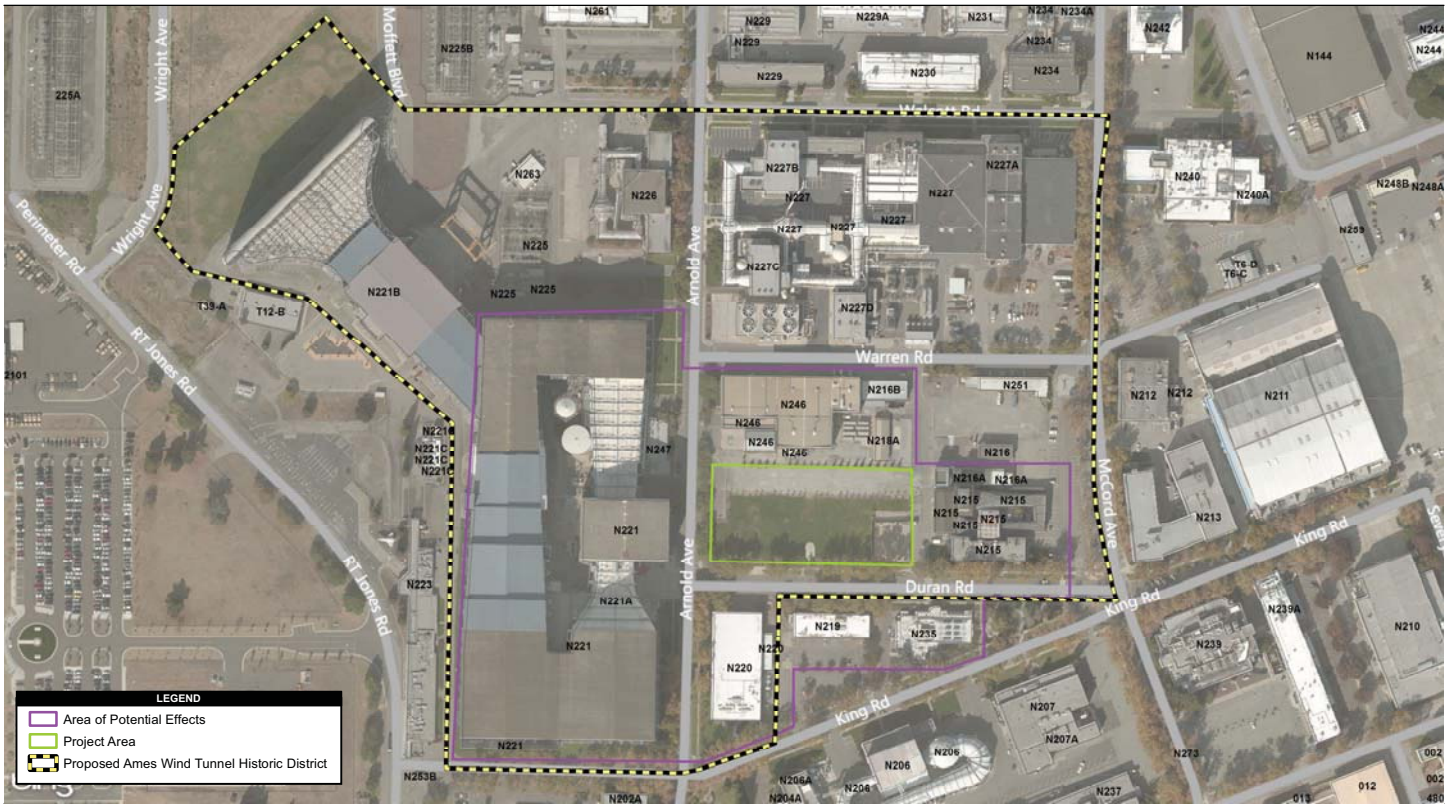
Architectural Resources Group, Inc. (ARG)

2004 *Draft National Register of Historic Places Registration Form for Ames Aeronautical Laboratory 40 x 80 Wind Foot Wind Tunnel*. On file at ARC.

Page and Turnbull

2005 *Reconnaissance Survey of NACA and NASA Buildings*. On file at ARC.

ATTACHMENT A
APE



Attachment A
Area of Potential Effects for the
Biological Sciences Laboratory N288 Project

ATTACHMENT B
SHPO CORRESPONDENCE

NPS FORM 10-900
(Rev. 10-90)
United States Department of the Interior
National Park Service

OMB NO. 1024-0018

NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "X" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor or computer to complete all items.

1. Name of Property

historic name: Ames Aeronautical Laboratory 40 x 80 Foot Wind Tunnel

other names/site number: Ames Research Center 40 x 80 Foot Wind Tunnel (Building N-221)

2. Location

street and number DeFrance Avenue ☐ Not for publication

city or town Mountain View vicinity

state California code CA county Santa Clara code 085 zip code 94035

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I herby certify that this ___ nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ___ meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant ___ nationally ___statewide ___ locally.
___ See continuation sheet for additional comments.)

Milo Wayne Arch 25 JUN 2008

Signature of certifying official Date

State or Federal agency and bureau

In my opinion, the property ___ meets ___ does not meet the National Register criteria. (___ see continuation sheet for additional comments.)

Signature of commenting or other official Date

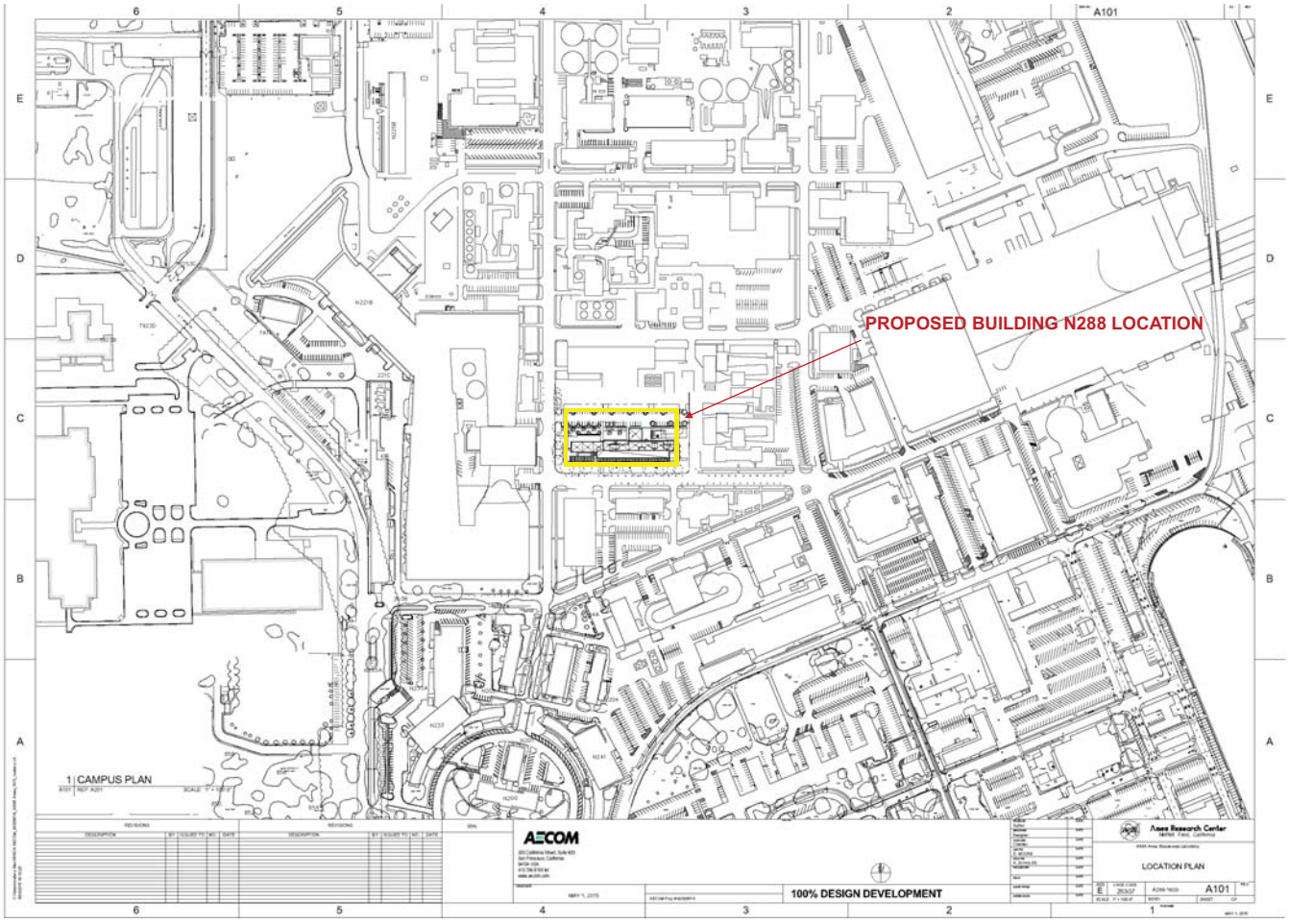
State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that this property is: Signature of the Keeper Date of Action

☐ entered in the National Register
☐ see continuation sheet
☐ determined eligible for the National Register
☐ see continuation sheet
☐ determined not eligible for the National Register
☐ removed from the National Register
☐ other (explain): _____

ATTACHMENT C
LOCATION PLAN


PROPOSED BUILDING N288 LOCATION
1 CAMPUS PLAN
A101
AECOM
100% DESIGN DEVELOPMENT
Ames Research Center
LOCATION PLAN
A101

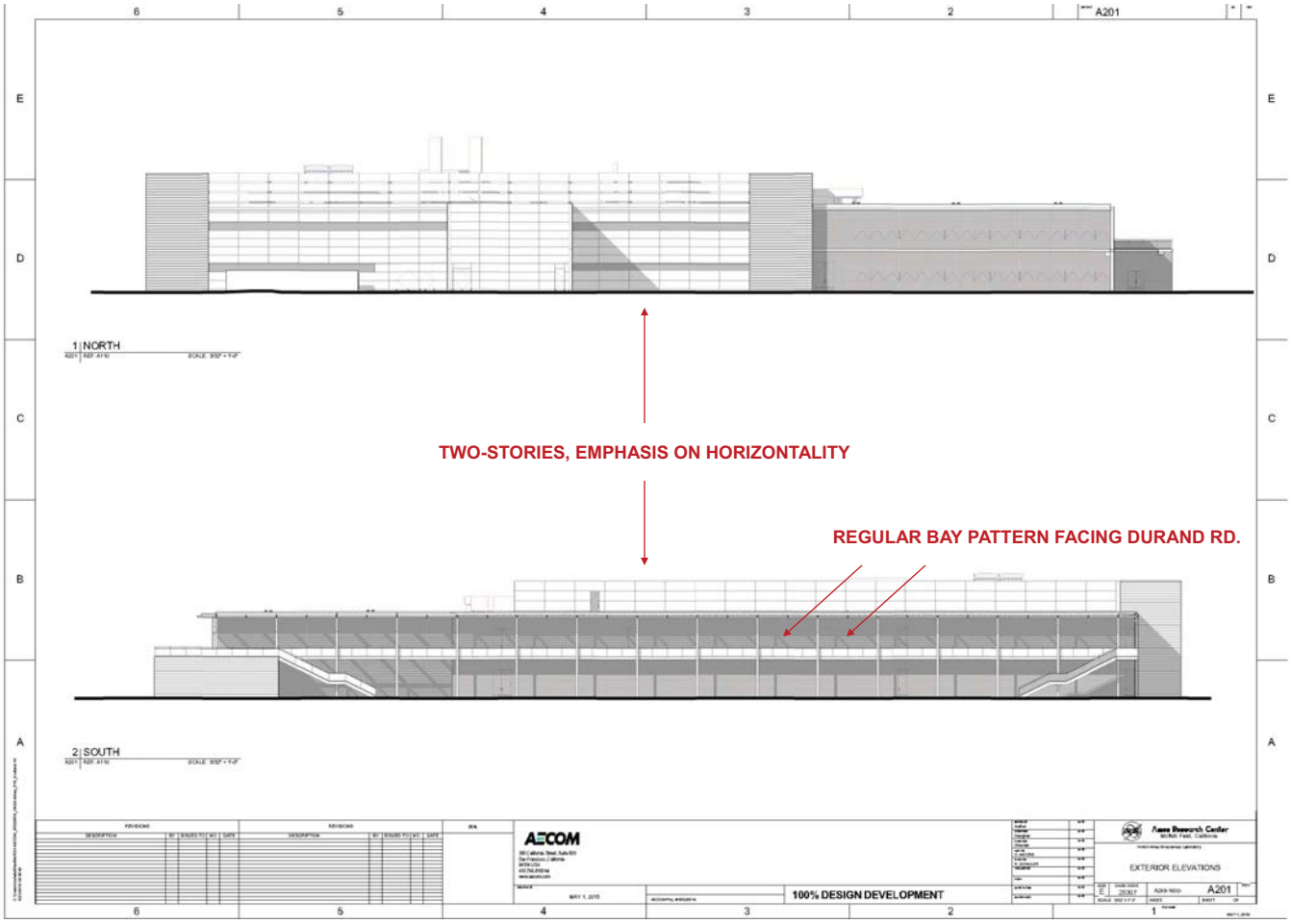
ATTACHMENT D
SITE PLAN

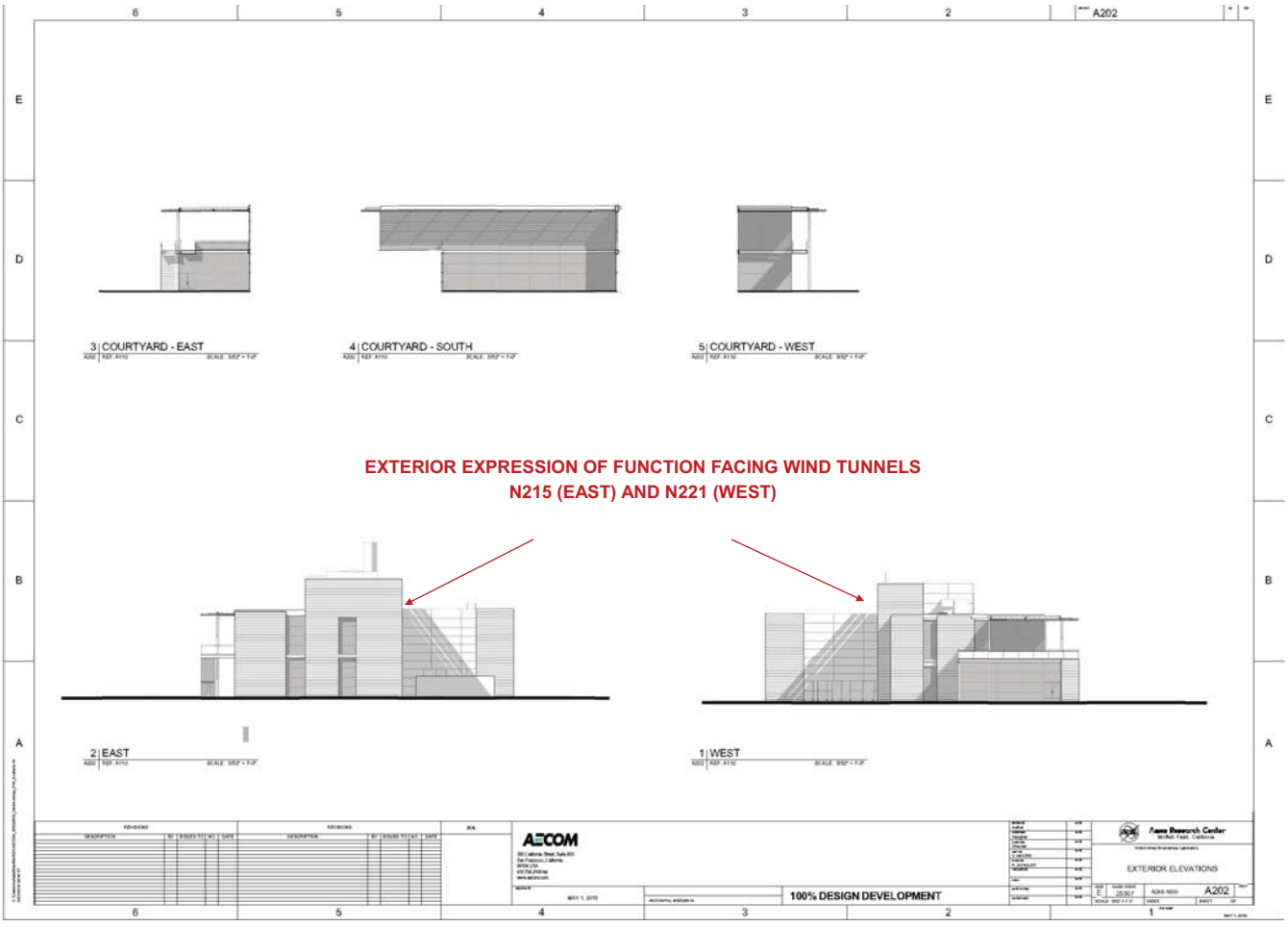
The following content was redacted from this public posting:

Attachment D
Site Plan Map with Floor Plan

ATTACHMENT E

ELEVATIONS


A201
1 | NORTH
TWO-STORIES, EMPHASIS ON HORIZONTALITY
REGULAR BAY PATTERN FACING DURAND RD.
2 | SOUTH
AECOM
100% DESIGN DEVELOPMENT
EXTERIOR ELEVATIONS
A201


A202
3 | COURTYARD - EAST
4 | COURTYARD - SOUTH
5 | COURTYARD - WEST
EXTERIOR EXPRESSION OF FUNCTION FACING WIND TUNNELS
N215 (EAST) AND N221 (WEST)
2 | EAST
1 | WEST
AECOM
100% DESIGN DEVELOPMENT
Ames Research Center
EXTERIOR ELEVATIONS
A202

ATTACHMENT F

EXISTING FEATURES AND MATERIALS IN THE AMES WIND TUNNEL HISTORIC DISTRICT

Fig. F– 1. Building N215, side adjacent to the project site (view facing northeast).

Fig. F–2. Building N220, side adjacent to the project site (view facing southwest).

Fig. F–3. Building N221, side adjacent to the project site (view facing northwest).

ATTACHMENT G

RENDERINGS

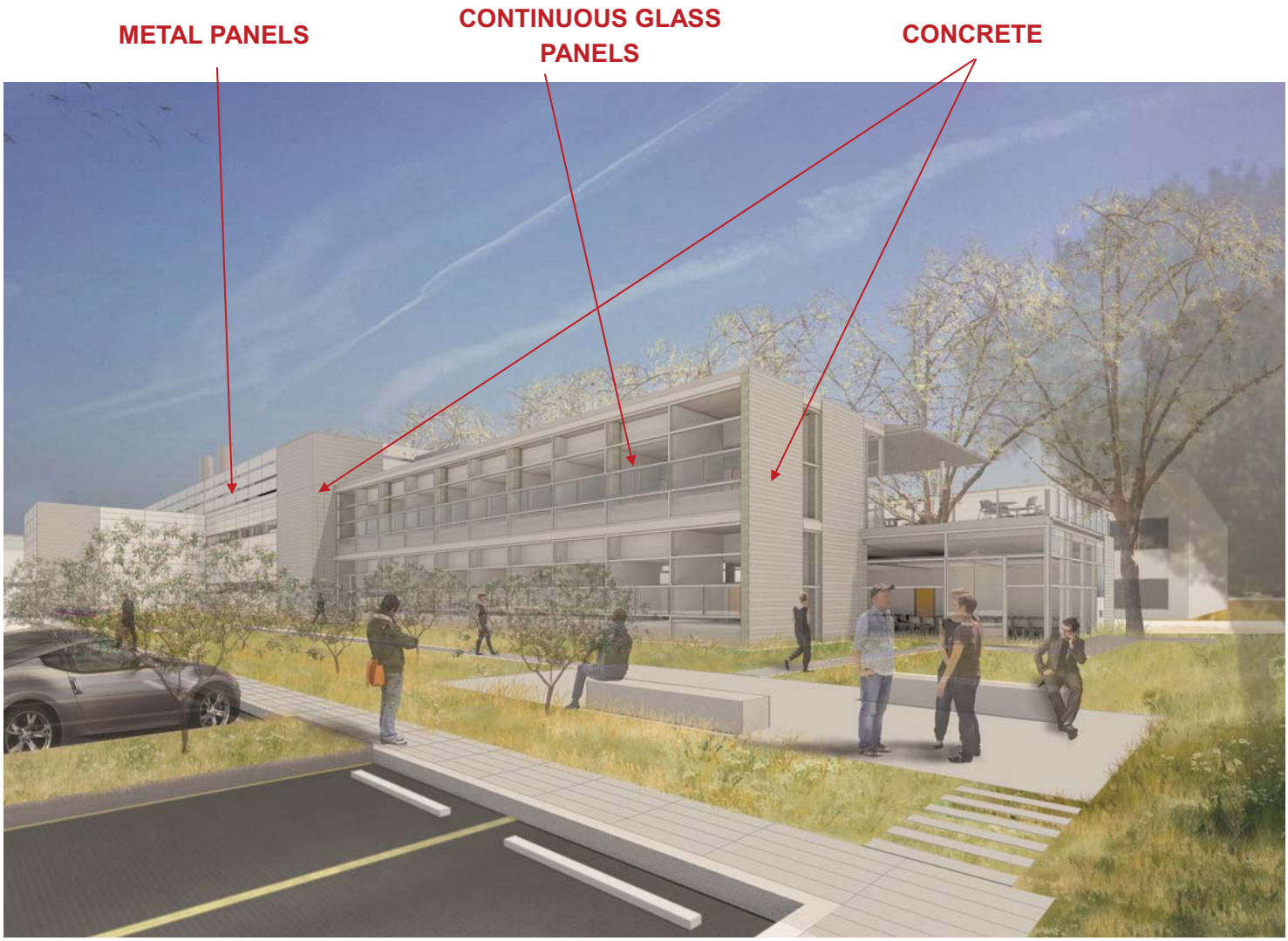


Fig. G–1. Proposed Building N288, northwest corner (view facing southeast, towards Building 220 pictured in background).

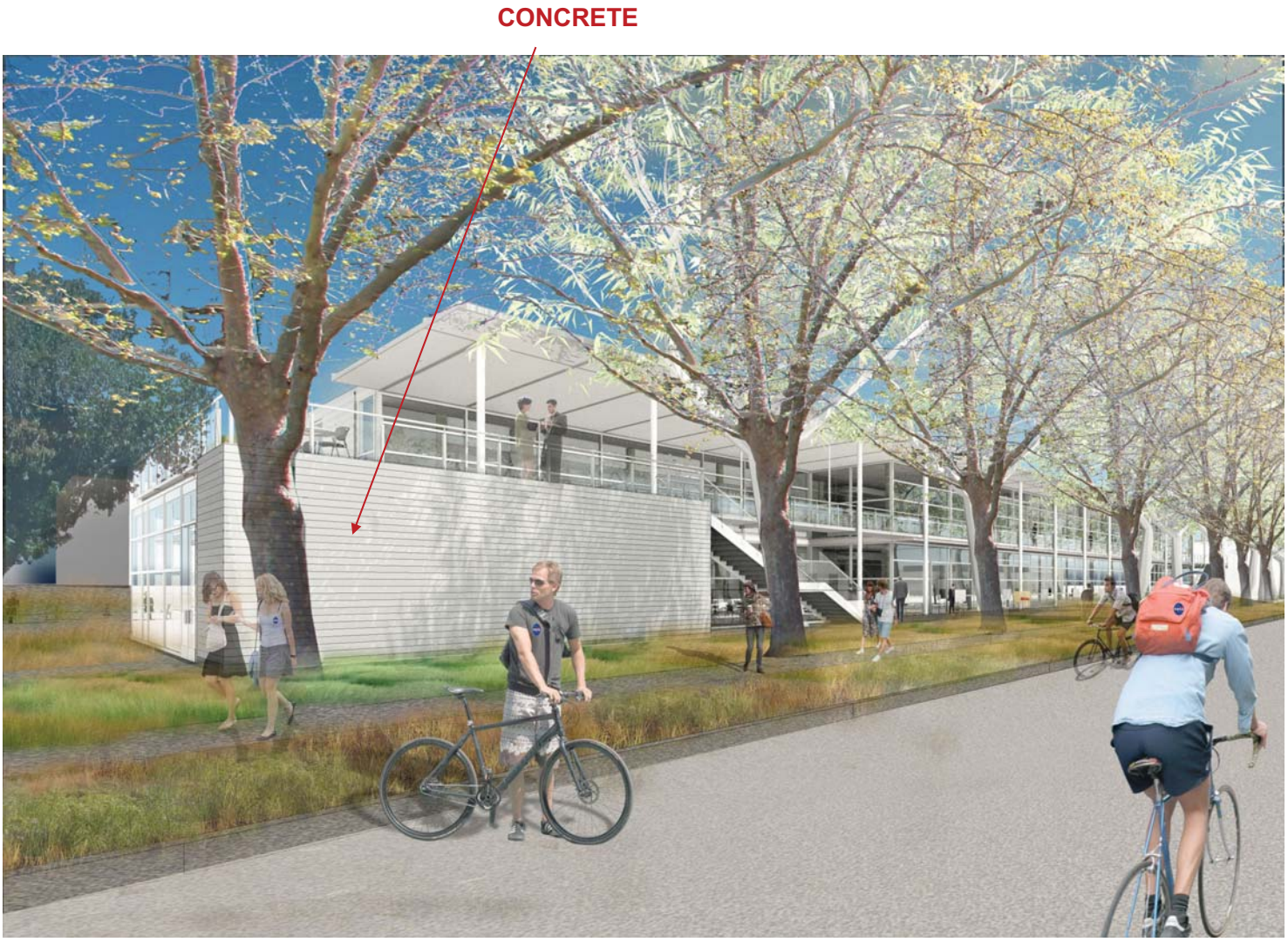


Fig. G–2. Proposed Building N288, southwest corner (view facing northeast from Durand Road).

Fig. G–3. Proposed Building N288, south courtyard (view facing west, towards Building N221 pictured in background).

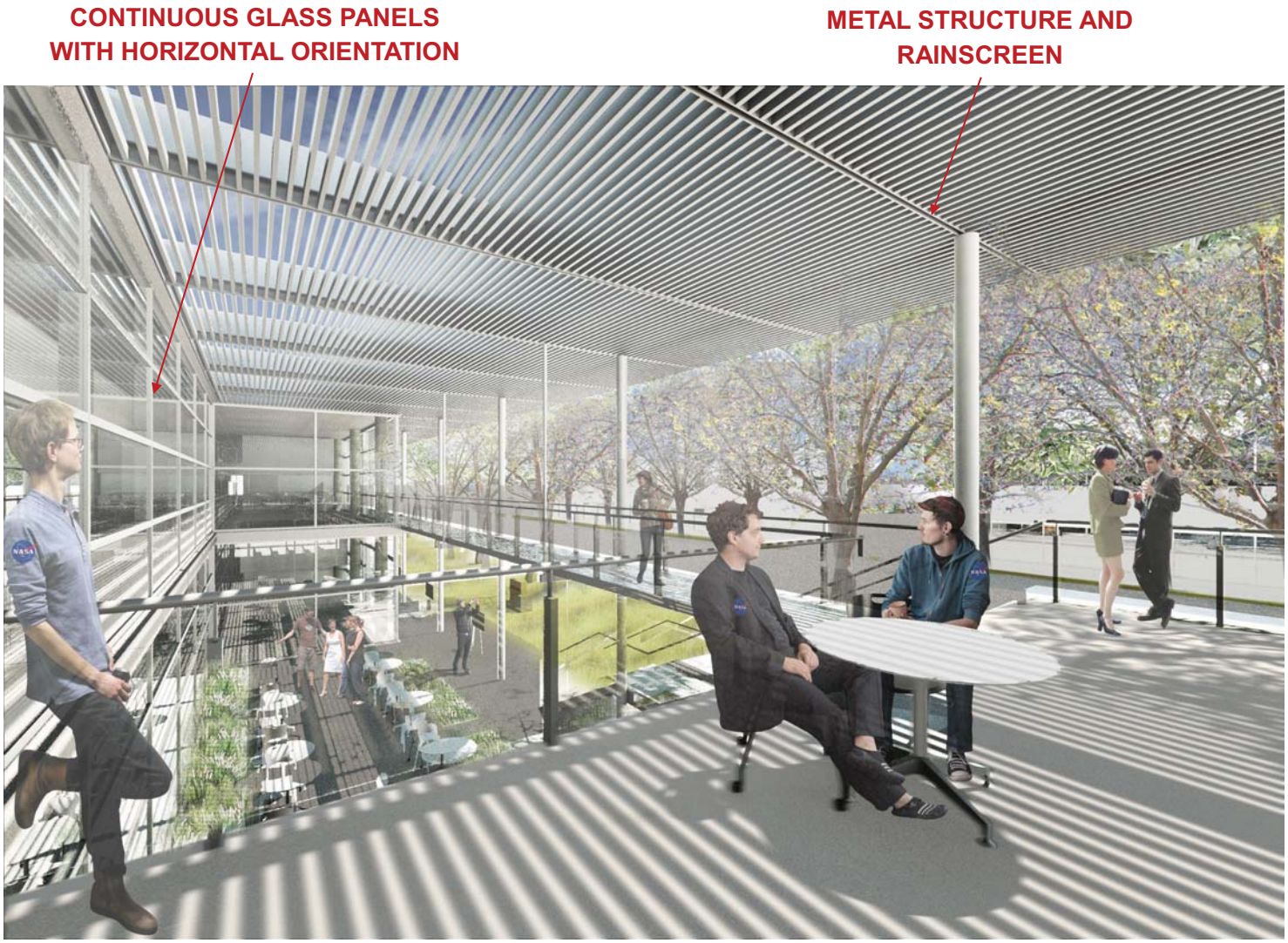


Fig. G–4. Proposed Building N288, southwest terrace (view facing southeast).

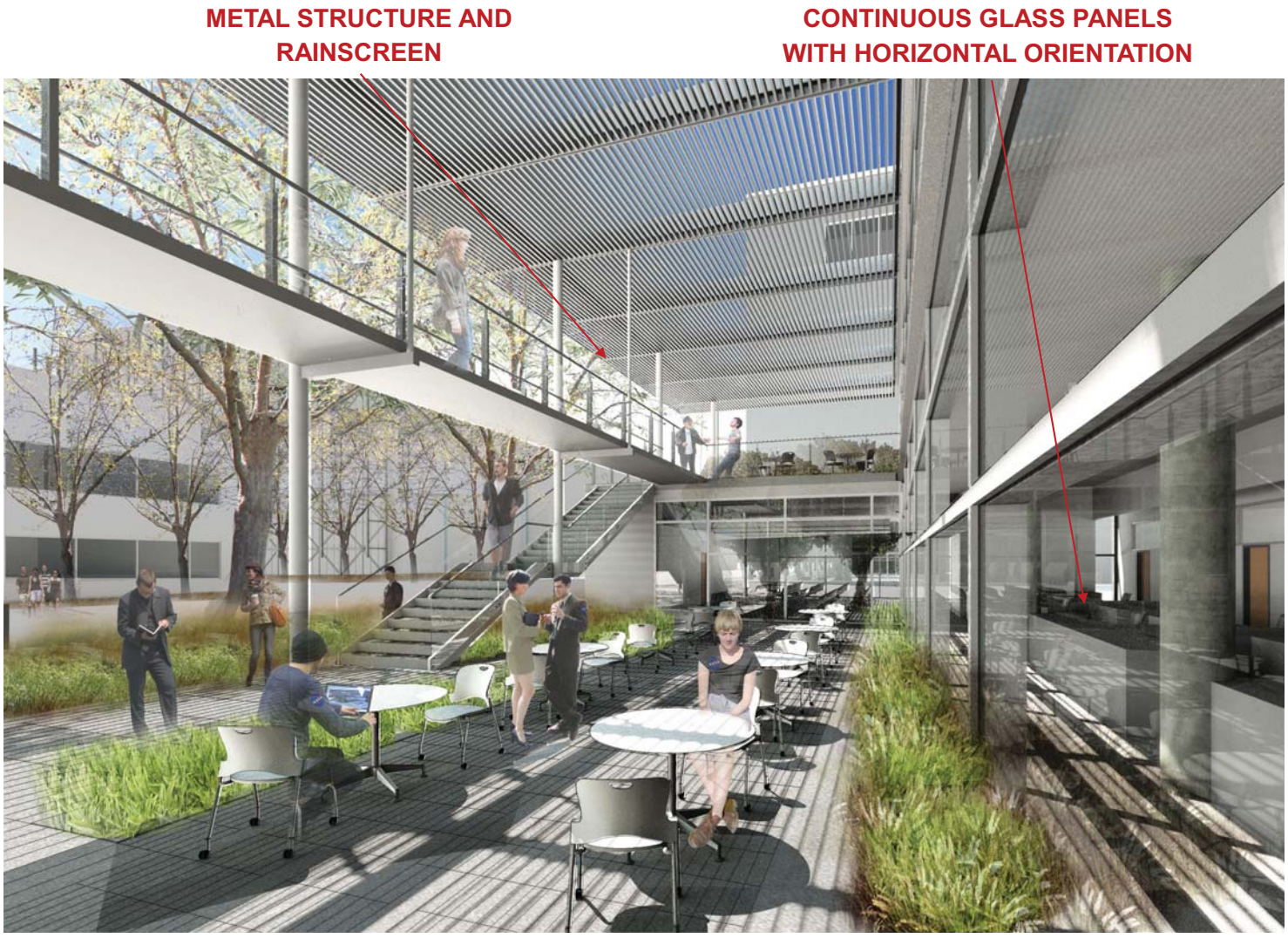


Fig. G–5. Proposed Building N288, south courtyard (view facing southwest, towards Buildings N220 and N221 pictured in background).